



# Adolescent Health Research Updates

## Supplement to the Adolescent Health Plan

No 2 — January 1997

Research Updates are periodically distributed from the Alaska Adolescent Health Advisory Committee (AHAC). AHAC believes that effective planning for the health of Alaska's adolescents should have a strong scientific basis. *Alaska's Adolescents: A Plan for the Future*, the 1994 publication by AHAC, was the product of the committee's review of research related to adolescent health at that time. In order to stay current with new information, AHAC continually reviews research dealing with a broad range of adolescent health topics. Summary reports are prepared by AHAC members for distribution to people interested in teen health, especially those who use Alaska's Adolescents as a guide for their efforts in the field. Feedback about the usefulness of these updates would be welcomed.

## Unintentional Injury Among Adolescents

Injury is crippling our youth. Both national and state statistics report its toll.<sup>1,2,3</sup> Nationally, each year more lives are lost to injury than to all combined causes of death during the entire Vietnam war.<sup>1</sup> In Alaska, as in the nation, injury is the leading cause of death among youth aged 10-19.<sup>2</sup> Young people today die mainly as a result of injury from contact with vehicles, alcohol and firearms.<sup>2</sup>

What could prevent these deaths? There are many strategies that have been shown to prevent injury deaths. The licensing of all-terrain vehicle (ATV) users, curfews, helmet use, and the enforcement of alcohol laws are examples of effective means of saving lives.<sup>4</sup>

Injuries are considered either intentional (e.g., assaults, homicide, suicide) or unintentional (e.g., motor vehicle & bicycle crashes, drowning). Because subsequent reports will address violence and suicide, this report will focus on unintentional injury. Research on injury prevention demonstrates that unintentional injuries are predictable and preventable. The term "accident" is not used because it implies that the incident is unavoidable.

## National Data

Unintentional injuries cause more than half of all deaths among adolescents.<sup>2</sup> Deaths are just the tip of the iceberg, however, as there are 16 hospitalized injuries for every death, and more than 300 doctor visits for every death, across all age groups.<sup>3</sup>

The Office of Technology, a scientific research group established by the U.S. Congress, reports that:

- 75% of teen unintentional deaths are vehicle-related and 50% of those are alcohol-related.
- Drownings (40% alcohol-related), firearms, and fires come next in frequency.
- Sports injuries are the greatest cause of non-fatal injuries, foot ball being the most common cause. Knee injuries are the most common type.
- Ninety percent of bicycle deaths are bike-motor vehicle contacts, so the statistics are often part of the motor vehicle records.<sup>2</sup>

The Office of Technology Report has examined the demographics of unintentional injuries to adolescents and finds that there are variations with regard to:

- 1) **age:** the older the teen the more severe the injury;
- 2) **gender:** males are involved in many more injuries than females;
- 3) **ethnicity:** Native Americans' rate of injury is twice all others;
- 4) **residence:** the rural rate of injury is greater than urban;
- 5) **economic status:** poverty is correlated with a higher rate of injury;
- 6) **risk-taking behavior:**
  - a) alcohol use, even below "legal" limits, has a high association with fatal accidents;
  - b) 60% of adolescents don't wear seat belts, giving them twice the chance of being killed;
  - c) 90% of adolescents don't use bike helmets, giving them ten times the chance of severe injury.<sup>2</sup>

It has been found that children and adolescents with behavioral problems have over one and a half times the chance of injury compared with other children.<sup>5</sup> Behavior traits that are associated with increased injury risk include hyperactivity, aggression, and antisocial behavior.<sup>6</sup> As in other areas of adolescent research, early markers of risk such as poverty, parenting problems and aggressive behavior can be found as common denominators in the incidence of injury. Addressing the early

risk factors should be part of injury prevention and general adolescent health promotion. (7,8)

## Alaska Data

There are two excellent sources of information related to adolescent injury in Alaska: the Alaska Injury Prevention Plan, published by the State Injury Prevention Coalition in 1994<sup>3</sup>, and the Alaska Trauma Registry, which publishes periodic reports on injuries throughout the state.<sup>9,20</sup> From these two sources, we know that in Alaska:

- 1) Of all sources of unintended injuries, bicycles, sports, and ATV's have caused the greatest number of hospitalizations among young teens (age 10-14) for 1991-1992.<sup>9</sup>
- 2) Motor vehicles and suicide, more than anything else, killed older teens (age 15-19) during the 1991-1994 period. Injury death and hospitalization for this age group is twice the rate of any other age group.<sup>20</sup> Motor vehicle "accidents" are more likely to result in permanent disability than are other types of injuries.
- 3) Drowning was the second most common cause of death for kids, according to the 1991-1994 records. Half of these deaths were older teens.<sup>20</sup>
- 4) Native youth are hospitalized and die from injuries at more than twice the rate of any other ethnic group.<sup>20</sup>
- 5) Off-road vehicle injury was the most frequent cause of severe injury for 10-19 year-olds in many of Alaska's rural areas.<sup>20</sup>
- 6) Unintentional firearm injury was the second leading cause of hospitalization for the age 10-14 group in the Yukon-Kuskokwim region, in the most recent data.<sup>20</sup> Statewide, there has been a 45% increase in gunshot wounds to young people from 1991 to 1994.<sup>20</sup> The Alaska Youth Risk Behavior Survey (YRBS) indicates that more than a third of high school boys have carried weapons in the last month.<sup>21</sup>
- 7) For motorized injuries, lack of seat belts and helmets were contributing causes. The 1991-1994 records show that 29% of motorcycle crash victims under 18 years of age wore no helmet, even though helmet use is the law for this age group.<sup>20</sup>
- 8) For bicycle injuries, less than 4% of cyclists were wearing helmets when injured, according to the 1991-1994 statistics. The YRBS results show that close to 90% of high school students do not wear bike helmets.<sup>21</sup>
- 9) Alcohol was involved in many of the firearm, ATV and motor vehicle incidents in the 15-19 year-old age group.<sup>20</sup> Twelve

percent of high school students admit to drinking while driving in the 1995 YRBS. (21)

## Costs

While the U.S. Congress continues to limit the Center for Disease Control and Prevention (CDC) budget to study injury, the costs of injury to the U.S. public continue to rise. In Alaska, the cost of each hospital stay for each motorcycle injury patient who was not wearing a helmet is about \$27,000. Motor vehicle patients who were not wearing seat belts cost \$18,000. each.<sup>9</sup> National figures show that 60% of motorcycle injuries associated with no helmet use are paid by Medic-aid.<sup>1</sup> That means that the private decision to take risk comes right out of the public's pocket.<sup>1</sup>

## Injury Prevention

Approaches to injury prevention have evolved from faulting the victims to applying the public health disease model. The most recent approach involves "the 3 E's" of education/behavior, engineering/technology, and enforcement/ legislation. Research has shown that in general, the engineering approach is more effective than the enforcement approach, and that education has been least effective.<sup>2</sup> Modifying the environment of individuals—through engineering or public policy—seems to be the most successful way to reduce the greatest number of injuries.

Ten years ago Frederick Rivara published a report that outlined the means for preventing injury to children.<sup>10</sup> Although it reflects what we know about effective injury prevention, the methods have not been consistently employed. What seems to be lacking is political will. Actions that can prevent a third of the deaths among children are not being taken.

This section summarizes what is known about prevention strategies for the three major causes of death among teens in Alaska: vehicles, drownings, and guns.

## Vehicle Injury

Vehicle injury is the most thoroughly studied as well as the most frequent cause of death. Fortunately, it is very clear that the following

- 1) increase in the price of alcohol (tax)<sup>4</sup>
- 2) curfews (that eliminate the dangerous driving hours)<sup>4</sup>
- 3) use of motorcycle helmets<sup>4</sup>
- 4) use of bicycle helmets<sup>4</sup>
- 5) use of seat belts<sup>4</sup>
- 6) decrease in speed limits (the recent national increase is expected to cause at least 4000 more deaths each year)<sup>4</sup>
- 7) decrease of legal blood alcohol level<sup>11</sup>
- 8) delay of licensing and/or provisional licensing<sup>11</sup>
- 9) graduated licensing<sup>27</sup>
- 10) community based, coordinated, comprehensive programs to alter social norms in all age groups.<sup>1</sup>

11

Research shows the following does not work:

- 1) driver education programs (which, instead, seem to put inadequately trained teens onto the highways earlier)<sup>1</sup>
- 2) alcohol education programs alone, without license suspension following DWI convictions.<sup>4</sup>

In Alaska, the impact of ATV and snowmachine use is also significant. The American Academy of Pediatrics recommends drivers be licensed for snowmachines.<sup>12</sup> The National Committee for Injury Prevention and Control (NCIPC) recommends age and use controls on ATV's.<sup>4</sup> Alaska injury prevention experts also recommend the use of helmets for snowmobiles and ATV's.<sup>20</sup>

## Drowning

Drownings represent almost 25% of unintentional deaths in Alaska. What would prevent them includes:

- 1) use of personal flotation devices (PFDs)<sup>4</sup>
- 2) laws, with funding for enforcement, requiring the use of PFDs<sup>4</sup>
- 3) blood alcohol laws applied to boating.<sup>4</sup>

## Guns

Guns are a major factor in both unintentional and intentional injury. It is difficult to separate the research on violence, guns and unintentional injury because the studies often include suicide, homicide and "accidents". What is clear is that the states that have the most guns, have the most injuries from guns.<sup>13</sup> Detroit has more gun deaths per capita than Northern Ireland during its worst IRA troubles.<sup>1</sup> According to national researchers, at least half of our homes have firearms.<sup>17</sup> Half of

those have them in unlocked places.<sup>18</sup> In homes with both firearms and children, one-fourth of the firearms are stored unlocked and loaded.<sup>19</sup> Eighty-five percent of teens have access to guns.<sup>13</sup> Eighty-nine percent of child and teen firearm deaths occur in the home, with the peak incidence occurring between 4:00 and 5:00 PM.<sup>23</sup> In Alaska, there is one licensed gun dealer for every 75 people under age 25.<sup>24</sup>

What works to prevent gun injuries:

- 1) mandatory sentences for possession of guns during specific crimes (result in fewer gun deaths)<sup>2</sup>
- 2) handgun control laws (result in fewer suicides)<sup>2</sup>

Possible prevention strategies: Owner liability, firearm registration and licensing, ammunition modification, handgun bans, toy gun regulations, plastic handgun bans are all possible. There are pros and cons to each of these, and using multiple approaches may prove to be the best way.<sup>15</sup>

Alaska injury prevention experts also recommend the storage of guns a) unloaded, b) in locked locations, and c) with ammunition stored in a separate location.<sup>20</sup>

There is no evidence that the following work:

- 1) firearm safety programs aimed at kids<sup>17</sup>
- 2) increasing trigger pressure requirements.<sup>16</sup>

## Summary

The research literature clearly demonstrates that unintentional injury costs us severely in lives, quality of life, and expense. In Alaska, vehicle injury, drowning, and firearms cause the greatest injury to youth. Many unintentional injuries can be prevented. The most effective prevention strategies are those in which the environment in which people work, live, and play is changed, through technology or public policy. Education has a role to play in prevention as well, especially when it is paired with technology and legislation. What is needed to employ effective strategies is a well-informed public and legislative leadership.

*Submitted by Elizabeth Hatton, MD*

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Adolescent Health Program Staff ..... Becky Judd  
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## References

1. Robertson, L.S. *Injury Epidemiology*. Oxford University Press. 1992.
2. Office of Technology Assistance. "Accidental Injuries: Prevention and Services". Vol II, 1991. Chap. 5
3. State Injury Prevention Coalition. *Alaska Injury Prevention Plan*. State of Alaska, DHSS, Division of Public Health. December 1994.
4. The National Committee for Injury Prevention and Control. *Injury Prevention: Meeting the Challenge*. Supplement to the American Journal of Preventative Medicine. Oxford University Press. 1989.
5. Bussing, R. et al. "Relationship Between Behavioral Problems and Unintentional Injuries in U. S. Children." *Archives of Pediatric and Adolescent Medicine*. Vol 150, Jan. 1996. p. 50-56.
6. Christoffel, K. et al. "Psycho-social Factors in Childhood Pedestrian Injury: A Matched Case-Control Study." *Pediatrics*. 97:1, Jan. 1996. p. 33-42.
7. Irwin, C. et al. "Health Consequences of Behaviors: Injury as a Model." *Pediatrics*. 90:5, Nov. 1992. Supplement, Part 2. p. 798-803.
8. Hawkins, J.D. et al. "Risk and Protective Factors for Alcohol and Other Drug Problems in Adolescence and Early Adulthood: Implications for Substance Abuse Prevention." *Psychological Bulletin*. 112:1, 1992. p. 64-105.
9. Moore, M. "Overview of Serious and Fatal Injury in Alaska (1991 -1992)." Emergency Medical Services, DHSS, Division of Public Health. 1993
10. Rivara, F. "Traumatic Deaths of Children in the United States: Currently Available Prevention Strategies." *Pediatrics*. 75:3, Mar. 1985. p. 456-462.

11. Hudson, R. and Howland, J. "Promoting Safety in Adolescents." in *Promoting The Health of Adolescents*. Milistein, S., et al., eds. Oxford University Press. 1993.
12. American Academy of Pediatrics Committee on Accident and Poison Prevention. "Snowmachine Statement." *Pediatrics*. 82:5, Nov. 1988. 798.
13. Earls, F., et al. "The Control of Violence and the Promotion of Nonviolence in Adolescents." in *Promoting the Health of Adolescents*. Milistein, S., et al., eds. Oxford University Press. 1993. 285-304.
14. American Academy of Pediatrics Committee on Adolescence. "Firearms and Adolescents." *Pediatrics*. 89:4, Apr 1992. 784.
15. Christoffel, K. "Toward Reducing Pediatric Injuries From Firearms: Charting a Legislative and Regulatory Course." *Pediatrics*. 88:2, Aug 1991. 294-305.
16. Naureckas, S., et al. "Children's and Women's Ability to Fire Handguns." *Archives of Pediatric and Adolescent Medicine*. Vol. 49, Dec. 1995. 1318-1322.
17. American Academy of Pediatrics Committee on Injury and Poison Prevention. "Firearm Injuries Affecting the Pediatric Population." *Pediatrics*. 89:4, Apr. 1992. 788-790.
18. Senturia, Y. "Gun Storage Patterns in U. S. Homes With Children." *Archives of Pediatric and Adolescent Medicine*. Vol. 150, Mar. 1996. 265-269.
19. Goldberg, B., et al. "Firearm Injury Risk Among Primary Care Patients." *Journal of Family Practice*. 41:2, Aug. 1995. 158-62.
20. Personal Communication, Martha Moore, Alaska Trauma Registry, Department of Health and Social Services. Nov. 25, 1996.
21. Youth Risk Behavior Survey Alaska Report. State of Alaska Departments of Education and Health and Social Services. 1995.
23. Guohua, L., et al., "Factors Associated With the Intent of Firearm-Related Injuries in Pediatric Trauma Patients." *Archives of Pediatric and Adolescent Medicine*. Vol 150, Nov 1996. 1160-1165.
24. Children's Safety Network, "Licensed Gun Dealers, USA". 1996.
25. Lewit B. and Baker. "Unintentional Injuries." *Future of Children*. 5:1, Spring 1995. 214-222.
26. Dowd, M.D. et al. "Pediatric Firearm Injuries, Kansas City, 1992: A Population-Based Study." *Pediatrics*. 92:6, Dec. 1994. p. 867-873.
27. Rivara, F.P. Proceedings on "Where we go from here, a Pacific Northwest Regional Symposium on Reducing Motor Vehicle-Related Injury." Harbor View Injury Prevention and Research Center. 1996.